Claims

What is claimed is:

1. A method for growing cells comprising

reviving cells for culturing in the presence of a cryoprotectant, wherein the cells are diluted in a growth medium such that cell viability is maintained.

2. The method defined in claim 1

wherein the cryoprotectant is DMSO.

3. The method defined in claim 2

wherein DMSO is present in an amount of less than 2% by volume based on total volume of cells and media present.

4. The method defined in claim 1

wherein the cells are grown in a self-contained cell culture vessel.

5. A kit comprising

a self-contained cell culture vessel;

cells and a cryoprotectant disposed in a cell reservoir;

a liquid cell culture media of disposed in an internal chamber of the vessel or in a media reservoir of an amount capable of diluting the cryoprotectant to a volume suitable for cell growth; and

gas disposed in the gas reservoir.

6. The kit defined in claim 5 maintained at a subzero temperature.

7. A method for growing cells in a self-contained cell culture vessel at a temperature suitable for cell culturing comprising:

incubating the kit defined in claim 5 or 22.

8. The kit defined in claim 5 wherein

the cell culture vessel comprising

the internal chamber defines a space therein and has an internal surface;

the internal chamber defines at least one optional sealable port or channel;

the internal chamber defines at least one sealable opening for receiving a gas reservoir capable of fluid communication with the internal chamber;

wherein the gas reservoir contains a valve or removable seal defined between the gas reservoir and the internal chamber or the gas reservoir is a self-contained reservoir that is capable of being disposed of within the internal chamber;

wherein the cell reservoir is capable of fluid communication with the internal chamber and defines an optional valve therebetween;

wherein the media reservoir is capable of fluid communication with the internal chamber and defines an optional valve therebetween;

wherein the vessel is capable of being sealed; and

wherein the vessel is made from a material capable of withstanding subzero temperatures without degrading.

9. The kit defined in claim 8 wherein the vessel further comprises

a liquid impermeable flexible partition having two sides displaced within the internal chamber;

wherein the partition is capable of exchanging gas between said first and second space;

wherein the first side defines a first space for containing a liquid which is in communication with at least one port or channel and defines a sealable access port, and

wherein the second side defines a second space for containing a gas which is capable of fluid communication with the gas reservoir; and

wherein the edges of the partition are sealed to a portion of the internal surface of the internal chamber to prevent liquid communication between said spaces.

10. The kit defined in claim 9, wherein the vessel further comprises

a fluid impermeable expandable wall affixed to a rigid wall of the internal chamber and forming an integral portion of the internal chamber; and

wherein the fluid impermeable expandable wall and the partition define the gas space.

11. The kit defined in any of claims 5-10

wherein the valve or seal is capable of opening and closing;

wherein at least one port or channel sealably connects to at least one media chamber through at least one fluid channel, wherein at least one valve or seal is displaced between each port or channel and each media chamber;

wherein at least one port or channel sealably connects to at least one absorbent chamber wherein at least one valve or seal is displaced between each additional port or channel and the absorbent chamber; and

further comprising a cell filter proximal to each valve or seal and between each valve and seal and each absorbent chamber.

12. The kit defined in any of claims 5-11,

wherein the gas reservoir is a self-contained capsule disposed within the internal chamber.

13. The kit defined in any of claims 5-12,

wherein the gas reservoir disposed outside the internal chamber.

14. The kit defined in any of claims 5-13,

wherein the cell reservoir and the media reservoir are present in the internal chamber.

15. The kit defined in any of claims 5-14,

where in the cell reservoir and/or the media reservoir is a self-contained capsule.

16. The kit defined in any of claims 5-15,

wherein the seal or valve defined between the gas reservoir and the internal chamber is selected from the group consisting of a) a temperature sensitive plug; b) a diaphragm adapted to be penetrated, or c) a mechanically, thermally or electrically operated valve.

17. The kit defined in claim 16,

further comprising a safety seal in addition to the temperature sensitive plug.

18. The kit defined in claims 5-17,

wherein the internal chamber is removably or fixedly connected to at least one measuring device via at least one port or channel.

19. The kit defined in claim 18,

wherein the measuring device is at least one Micro Electro Mechanical System (MEMS) and/or high performance liquid chromatograph (HPLC).

20. The kit defined in any of claims 5-19,

wherein at least one port or channel defines at least one mechanism to provide fluid communication between the internal chamber and the measuring device.

21. The kit defined in claim 20,

wherein the mechanism is a ball valve or perforable diaphragm.

22. The kit defined in any of claims 5-21,

wherein the internal chamber defines one or two ports or channels.

23. The kit defined in claim 21,

wherein the measuring device further comprises a member for operating the ball valve or for penetrating the diaphragm.

24. The kit defined any of claims 5-23 further comprising

a filter on the port or channel for preventing contamination in the internal chamber.

25. The kit defined in any of claims 9-24

wherein the sealable access port is removably sealed with an access port closure.

26. The kit defined in any of claims 5-25 further comprising

at least one sensor externally connected to at least one port or channel or disposed inside the internal chamber.

27. The kit defined in claim 19

wherein the sensor senses oxygen, CO_2, or pH levels.

28. A method to transport cells from a distribution site to a site where a transplant takes place, comprising

transporting the kit defined in claim 6 at a temperature suitable for maintaining cell viability to a site where the cell transplant takes place; and

reviving said cells in said vessel at a transplant site.

29. The method defined in claim 28 wherein the cells are islet cells.

30. The method defined in claim 28 or 29 wherein the temperature suitable for maintaining cell viability is selected from the group consisting of minus 80° C, minus 20° C, and 4° C